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PEAT MARWICK MITCHELL AND CO SAN FRANCISCO CALIF  
NEW YORK TASK FORCE DELAY STUDIES, OPTIMIZED RUNWAY USE EXPERIM—ETC(U)  
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NEW YORK TASK FORCE DELAY STUDIES,  
OPTIMIZED RUNWAY USE EXPERIMENTS.

LaGuardia Airport,  
John F. Kennedy International Airport.

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Prepared by

Peat, Marwick, Mitchell & Co.  
San Francisco, California

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Table 1

HOURLY RUNWAY CAPACITIES  
New York Task Force Delay Studies  
LaGuardia Airport

Runway use	Runway configurations		Hourly capacity (operations/hour) <sup>a</sup>		
	Arrivals	Departures	VFR	IFR1	IFR2
1	22	13	81	62	58
2	22	31	78	59	46
3	31	31	52	52	46
4	31	4	81	62	57
5	4	13	81	62	58
6	13	4	77	59	46
7	4	4	51	51	46
8	13	13	50	38	36

a. 50% arrivals.

Source: Peat, Marwick, Mitchell & Co.

Request for

1.  2.  3.  4.  5.  6.  7.  8.  9.  10.  11.  12.  13.  14.  15.  16.  17.  18.  19.  20.  21.  22.  23.  24.  25.  26.  27.  28.  29.  30.  31.  32.  33.  34.  35.  36.  37.  38.  39.  40.  41.  42.  43.  44.  45.  46.  47.  48.  49.  50.  51.  52.  53.  54.  55.  56.  57.  58.  59.  60.  61.  62.  63.  64.  65.  66.  67.  68.  69.  70.  71.  72.  73.  74.  75.  76.  77.  78.  79.  80.  81.  82.  83.  84.  85.  86.  87.  88.  89.  90.  91.  92.  93.  94.  95.  96.  97.  98.  99.  100.  101.  102.  103.  104.  105.  106.  107.  108.  109.  110.  111.  112.  113.  114.  115.  116.  117.  118.  119.  120.  121.  122.  123.  124.  125.  126.  127.  128.  129.  130.  131.  132.  133.  134.  135.  136.  137.  138.  139.  140.  141.  142.  143.  144.  145.  146.  147.  148.  149.  150.  151.  152.  153.  154.  155.  156.  157.  158.  159.  160.  161.  162.  163.  164.  165.  166.  167.  168.  169.  170.  171.  172.  173.  174.  175.  176.  177.  178.  179.  180.  181.  182.  183.  184.  185.  186.  187.  188.  189.  190.  191.  192.  193.  194.  195.  196.  197.  198.  199.  200.  201.  202.  203.  204.  205.  206.  207.  208.  209.  210.  211.  212.  213.  214.  215.  216.  217.  218.  219.  220.  221.  222.  223.  224.  225.  226.  227.  228.  229.  230.  231.  232.  233.  234.  235.  236.  237.  238.  239.  240.  241.  242.  243.  244.  245.  246.  247.  248.  249.  250.  251.  252.  253.  254.  255.  256.  257.  258.  259.  260.  261.  262.  263.  264.  265.  266.  267.  268.  269.  270.  271.  272.  273.  274.  275.  276.  277.  278.  279.  280.  281.  282.  283.  284.  285.  286.  287.  288.  289.  290.  291.  292.  293.  294.  295.  296.  297.  298.  299.  300.  301.  302.  303.  304.  305.  306.  307.  308.  309.  310.  311.  312.  313.  314.  315.  316.  317.  318.  319.  320.  321.  322.  323.  324.  325.  326.  327.  328.  329.  330.  331.  332.  333.  334.  335.  336.  337.  338.  339.  340.  341.  342.  343.  344.  345.  346.  347.  348.  349.  350.  351.  352.  353.  354.  355.  356.  357.  358.  359.  360.  361.  362.  363.  364.  365.  366.  367.  368.  369.  370.  371.  372.  373.  374.  375.  376.  377.  378.  379.  380.  381.  382.  383.  384.  385.  386.  387.  388.  389.  390.  391.  392.  393.  394.  395.  396.  397.  398.  399.  400.  401.  402.  403.  404.  405.  406.  407.  408.  409.  410.  411.  412.  413.  414.  415.  416.  417.  418.  419.  420.  421.  422.  423.  424.  425.  426.  427.  428.  429.  430.  431.  432.  433.  434.  435.  436.  437.  438.  439.  440.  441.  442.  443.  444.  445.  446.  447.  448.  449.  450.  451.  452.  453.  454.  455.  456.  457.  458.  459.  460.  461.  462.  463.  464.  465.  466.  467.  468.  469.  470.  471.  472.  473.  474.  475.  476.  477.  478.  479.  480.  481.  482.  483.  484.  485.  486.  487.  488.  489.  490.  491.  492.  493.  494.  495.  496.  497.  498.  499.  500.  501.  502.  503.  504.  505.  506.  507.  508.  509.  510.  511.  512.  513.  514.  515.  516.  517.  518.  519.  520.  521.  522.  523.  524.  525.  526.  527.  528.  529.  530.  531.  532.  533.  534.  535.  536.  537.  538.  539.  540.  541.  542.  543.  544.  545.  546.  547.  548.  549.  550.  551.  552.  553.  554.  555.  556.  557.  558.  559.  560.  561.  562.  563.  564.  565.  566.  567.  568.  569.  570.  571.  572.  573.  574.  575.  576.  577.  578.  579.  580.  581.  582.  583.  584.  585.  586.  587.  588.  589.  590.  591.  592.  593.  594.  595.  596.  597.  598.  599.  600.  601.  602.  603.  604.  605.  606.  607.  608.  609.  610.  611.  612.  613.  614.  615.  616.  617.  618.  619.  620.  621.  622.  623.  624.  625.  626.  627.  628.  629.  630.  631.  632.  633.  634.  635.  636.  637.  638.  639.  640.  641.  642.  643.  644.  645.  646.  647.  648.  649.  650.  651.  652.  653.  654.  655.  656.  657.  658.  659.  660.  661.  662.  663.  664.  665.  666.  667.  668.  669.  670.  671.  672.  673.  674.  675.  676.  677.  678.  679.  680.  681.  682.  683.  684.  685.  686.  687.  688.  689.  690.  691.  692.  693.  694.  695.  696.  697.  698.  699.  700.  701.  702.  703.  704.  705.  706.  707.  708.  709.  710.  711.  712.  713.  714.  715.  716.  717.  718.  719.  720.  721.  722.  723.  724.  725.  726.  727.  728.  729.  730.  731.  732.  733.  734.  735.  736.  737.  738.  739.  740.  741.  742.  743.  744.  745.  746.  747.  748.  749.  750.  751.  752.  753.  754.  755.  756.  757.  758.  759.  760.  761.  762.  763.  764.  765.  766.  767.  768.  769.  770.  771.  772.  773.  774.  775.  776.  777.  778.  779.  780.  781.  782.  783.  784.  785.  786.  787.  788.  789.  790.  791.  792.  793.  794.  795.  796.  797.  798.  799.  800.  801.  802.  803.  804.  805.  806.  807.  808.  809.  810.  811.  812.  813.  814.  815.  816.  817.  818.  819.  820.  821.  822.  823.  824.  825.  826.  827.  828.  829.  830.  831.  832.  833.  834.  835.  836.  837.  838.  839.  840.  841.  842.  843.  844.  845.  846.  847.  848.  849.  850.  851.  852.  853.  854.  855.  856.  857.  858.  859.  860.  861.  862.  863.  864.  865.  866.  867.  868.  869.  870.  871.  872.  873.  874.  875.  876.  877.  878.  879.  880.  881.  882.  883.  884.  885.  886.  887.  888.  889.  890.  891.  892.  893.  894.  895.  896.  897.  898.  899.  900.  901.  902.  903.  904.  905.  906.  907.  908.  909.  910.  911.  912.  913.  914.  915.  916.  917.  918.  919.  920.  921.  922.  923.  924.  925.  926.  927.  928.  929.  930.  931.  932.  933.  934.  935.  936.  937.  938.  939.  940.  941.  9

Table 2

HOURLY RUNWAY CAPACITIES  
 New York Task Force Delay Studies  
 John F. Kennedy International Airport

| Runway use | Runway configurations <sup>a</sup> |            | Hourly capacity <sup>b</sup><br>(operations/hour) |      |      |
|------------|------------------------------------|------------|---|------|------|
|            | Arrivals                           | Departures | VFR   | IFR1 | IFR2 |
| 1          | 31L,31R                            | 31L        | 73  | 52   | 53   |
| 2          | 22L,22R,13R                        | 22R        | 82  | 52   | 53   |
| 3          | 13L,13R,22L                        | 13R        | 80  | 52   | 53   |
| 4          | 4R,4L                              | 4L         | 72  | 52   | 53   |
| 5          | 31L                                | 31L        | 42  |      |      |
| 6          | 22R                                | 22R        | 47  | 47   | 43   |
| 7          | 4L                                 | 4L         | 44  | 44   | 41   |
| 8          | 13R                                | 13R        | 46  | 46   | 42   |
| 9          | 31R                                | 31R        | 45  |      |      |
| 10         | 22L,22R                            | 22R        | 78  | 52   | 53   |
| 11         | 13L,13R                            | 13R        | 79  | 52   | 53   |

a. Runway configurations 1 through 9 constitute "historic configurations"; configurations 1 through 4 and 10 through 11 constitute "optimized configurations."

b. 50% arrivals.

Source: Peat, Marwick, Mitchell & Co.

Table 3

OPTIMIZED VERSUS HISTORIC RUNWAY USE  
 New York Task Force Delay Studies  
 LaGuardia Airport

| Runway use                              | Runway configurations |            | Historic runway use (percent) |      |      | Optimized runway use (percent) |      |      |
|---|-----------------------|------------|-------------------------------|------|------|--------------------------------|------|------|
|   | Arrivals              | Departures | VFR                           | IFR1 | IFR2 | VFR                            | IFR1 | IFR2 |
| 1                                       | 22                    | 13         | 23.0                          | 1.9  | 0.8  | 20.9                           | 2.1  | 1.0  |
| 2                                       | 22                    | 31         | 23.6                          | 0.4  | 0.2  | 26.2                           | 0.6  | 0.3  |
| 3                                       | 31                    | 31         | 17.8                          | 0.1  | 0.0  | 10.9                           | 0.1  | 0.0  |
| 4                                       | 31                    | 4          | 14.7                          | 0.0  | 0.0  | 18.4                           | 1.0  | 0.5  |
| 5                                       | 4                     | 13         | 3.7                           | 1.9  | 1.8  | 10.9                           | 1.3  | 1.5  |
| 6                                       | 13                    | 4          | 4.3                           | 0.0  | 0.0  |                                |      |      |
| 7                                       | 4                     | 4          | 1.6                           | 1.3  | 0.6  | 2.1                            | 0.9  | 0.5  |
| 8                                       | 13                    | 13         | 1.2                           | 0.7  | 0.4  | 0.5                            | 0.2  | 0.1  |
| (Average hourly capacity <sup>a</sup> ) |                       |            | (71.5)                        |      |      | (73.9)                         |      |      |

a. Operations per hour at 50% arrivals.

Source: Peat, Marwick, Mitchell & Co.

Table 4

OPTIMIZED VERSUS HISTORIC RUNWAY USE  
 New York Task Force Delay Studies  
 John F. Kennedy International Airport

| Runway use                              | Runway configurations |            | Historic runway use, historic configurations (percent) |      | Historic runway use, optimized configurations (percent) |      | Optimized runway use, optimized configurations (percent) |      |
|---|-----------------------|------------|--|------|---|------|--|------|
|   |                       |            | VFR  | IFR1 | VFR   | IFR1 | VFR  | IFR2 |
|   | Arrivals              | Departures | VFR  | IFR1 | VFR   | IFR1 | VFR  | IFR2 |
| 1                                       | 31L, 31R              | 31L        | 37.4   | 0.1  | 0.3   | 40.7 | 0.1  | 0.3  |
| 2                                       | 22L, 22R, 31R         | 22R        | 18.4   | 0.6  | 2.1   | 18.4 | 0.6  | 2.1  |
| 3                                       | 13L, 13R, 22L         | 13R        | 16.5   | 0.6  | 1.1   | 16.5 | 0.6  | 1.1  |
| 4                                       | 4L, 4R                | 4L         | 8.1  | 3.4  | 2.3   | 9.3  | 3.8  | 2.4  |
| 5                                       | 31L                   | 31L        | 2.5  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| 6                                       | 22R                   | 22R        | 2.8  | 0.1  | 0.1   | 0.1  | 0.1  | 0.1  |
| 7                                       | 4L                    | 4L         | 1.2  | 0.4  | 0.1   | 0.1  | 0.1  | 0.1  |
| 8                                       | 13R                   | 13R        | 1.1  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| 9                                       | 31R                   | 31R        | 0.8  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  |
| 10                                      | 22L, 22R              | 22R        | 2.8  | 0.1  | 0.1   | 2.8  | 0.1  | 0.6  |
| 11                                      | 13L, 13R              | 13R        | 1.1  | 0.0  | 0.0   | 1.1  | 0.0  | 0.8  |
| (Average hourly capacity <sup>a</sup> ) |                       |            | (71.0)   |      | (73.6)  |      | (75.1)   |      |

a. Operations per hour at 50% arrivals.

Source: Peat, Marwick, Mitchell & Co.

Table 5

**SUMMARY OF ANNUAL DELAY MODEL RESULTS**  
**New York Task Force Delay Studies**  
**LaGuardia Airport**

| <u>Runway configuration</u> | <u>Runway use</u> | <u>Demand</u> | <u>Airfield improvements</u> | <u>Average annual delay (minutes)</u> | <u>Total annual delay (hours)</u> | <u>Annual delay cost (dollars)<sup>a</sup></u> |
|-----------------------------|-------------------|---------------|------------------------------|---------------------------------------|-----------------------------------|--|
| Historic                    | Historic          | 1978          | 1978                         | 18.1                                  | 106,500                           | \$ 99.0 million                                |
| Historic                    | Historic          | 1982          | 1978                         | 19.4                                  | 117,100                           | \$130.0 million                                |
| Historic                    | Historic          | 1982          | 1982                         | 18.6                                  | 111,800                           | \$124.1 million                                |
| Historic                    | Optimized         | 1978          | 1978                         | 13.5                                  | 79,600                            | \$ 74.0 million                                |
| Historic                    | Optimized         | 1982          | 1978                         | 14.6                                  | 87,800                            | \$ 97.5 million                                |
| Historic                    | Optimized         | 1982          | 1982                         | 14.1                                  | 84,700                            | \$ 94.0 million                                |

a. Assumes \$15.50 per minute for the 1978 mix and \$18.50 per minute for the 1982 mix.

Source: Peat, Marwick, Mitchell & Co.

Table 6

**SUMMARY OF ANNUAL DELAY MODEL RESULTS**  
 New York Task Force Delay Studies  
 John F. Kennedy International Airport

| <u>Runway configuration</u> | <u>Runway use</u> | <u>Demand</u> | <u>Airfield improvements</u> | <u>Average annual delay (minutes)</u> | <u>Total annual delay (hours)</u> | <u>Annual delay cost (dollars)<sup>a</sup></u> |
|-----------------------------|-------------------|---------------|------------------------------|---------------------------------------|-----------------------------------|--|
| Historic                    | Historic          | 1978          | 1978                         | 15.2                                  | 87,500                            | \$181.1 million                                |
| Historic                    | Historic          | 1982          | 1978                         | 31.4                                  | 215,300                           | \$435.3 million                                |
| Historic                    | Historic          | 1982          | 1982                         | 22.9                                  | 156,200                           | \$315.8 million                                |
| Optimized                   | Historic          | 1978          | 1978                         | 8.1                                   | 46,900                            | \$ 97.1 million                                |
| Optimized                   | Historic          | 1982          | 1978                         | 21.4                                  | 146,000                           | \$295.2 million                                |
| Optimized                   | Historic          | 1982          | 1982                         | 10.3                                  | 70,000                            | \$141.5 million                                |
| Optimized                   | Optimized         | 1978          | 1978                         | 7.5                                   | 43,400                            | \$ 89.8 million                                |
| Optimized                   | Optimized         | 1982          | 1978                         | 18.8                                  | 128,500                           | \$259.8 million                                |
| Optimized                   | Optimized         | 1982          | 1982                         | 9.9                                   | 67,000                            | \$135.5 million                                |

a. Assumes \$34.50 per minute for the 1978 mix and \$33.70 per minute for the 1982 mix.

Source: Peat, Marwick, Mitchell & Co.

Table 7

SUMMARY OF APPROXIMATE DELAY COST SAVINGS  
New York Task Force Delay Studies

LaGuardia Airport

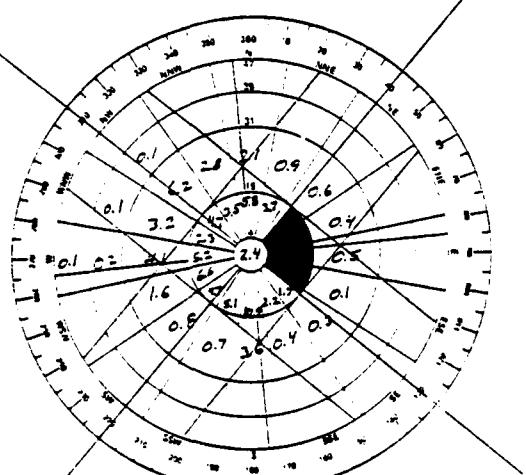
|   |    |                |
|---|----|----------------|
| 1978 Delay cost savings due to optimized runway use   | -- | \$25.0 million |
| 1982 Delay cost savings due to airfield improvements: |    |                |
| • without optimized runway use                        | -- | \$5.9 million  |
| • with optimized runway use                           | -- | \$3.5 million  |
| 1982 Delay cost savings due to optimized runway use:  |    |                |
| • without airfield improvements                       | -- | \$32.5 million |
| • with airfield improvements                          | -- | \$30.1 million |

John F. Kennedy International Airport

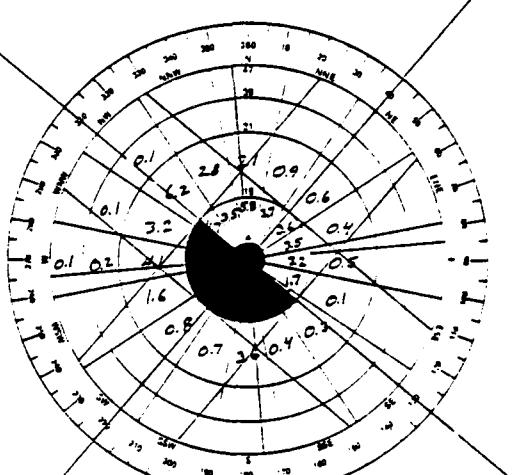
|   |    |                 |
|---|----|-----------------|
| 1978 Delay cost savings due to optimized configurations                               | -- | \$84.0 million  |
| 1982 Delay cost savings due to airfield improvements:                                 |    |                 |
| • without optimized configurations<br>and runway use                                  | -- | \$119.5 million |
| • with optimized configurations<br>alone  | -- | \$153.7 million |
| • with both optimized configurations<br>and runway use                                | -- | \$124.3 million |
| 1982 Delay cost savings due to optimized configurations:                              |    |                 |
| • without airfield improvements   | -- | \$140.1 million |
| • with airfield improvements  | -- | \$174.3 million |
| 1978 Delay cost savings due to optimized runway use with<br>optimized configurations  | -- | \$7.3 million   |
| 1982 Delay cost savings due to optimized runway use with<br>optimized configurations: |    |                 |
| • without airfield improvements   | -- | \$35.4 million  |
| • with airfield improvements  | -- | \$6.0 million   |

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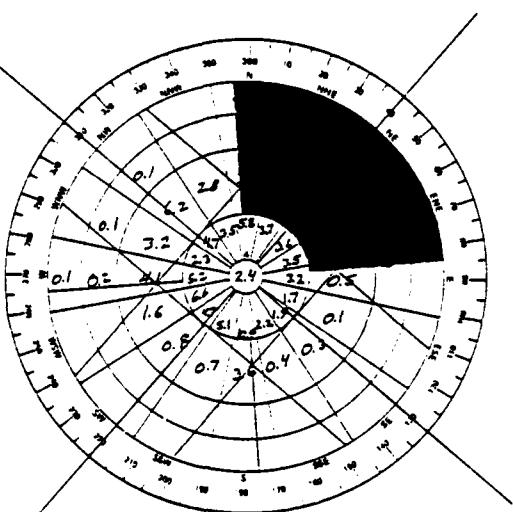
Source: Peat, Marwick, Mitchell & Co.



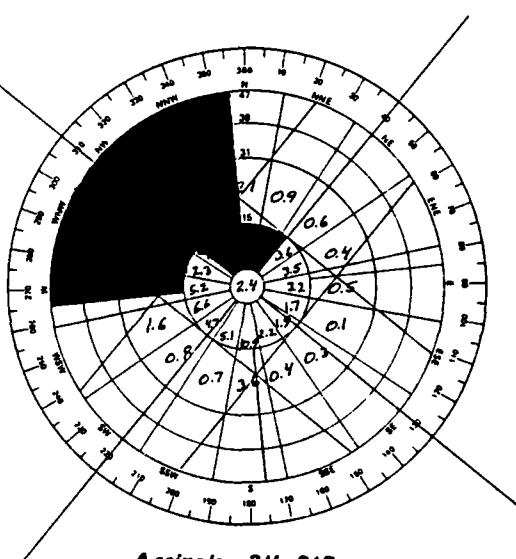
*Arrivals - 13L, 13R, 22L  
Departures - 13R*



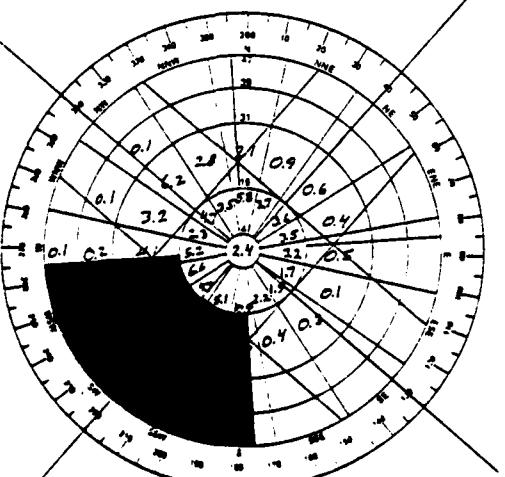
*Arrivals - 22L, 22R, 13R  
Departures - 22R*



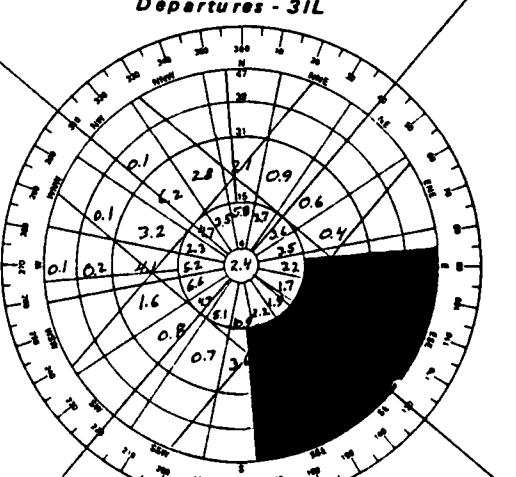
*Arrivals - 4L,4R  
Departures - 4L*



*Arrivals - 3IL, 3JR  
Departures - 3IL*



Arrivals - 22L, 22R  
Departures - 22R



Arrivals - 13L, 13R  
Departures - 13R

**EXHIBIT I**  
**WIND ROSES FOR VFR WITH**  
**NO PRECIPITATION**  
**JFK INTERNATIONAL AIRPORT**